



Charlotte Mason's House of Education,
Scale How, Ambleside, UK, 2009

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band to the last, till they scatter evenly, solitarily, jealously, over the land, as separate holders of it? Like a veritable army of invaders do they come, parcelling out the land among them. And surely, could we catch their flight at dawn, when level sun-rays shoot through their spread flame-like pinions, they would seem as a living cloud of fire! Yet of this wonderful invasion we are in total ignorance till it has taken place.

At our feet is another of the queries of Nature. Upon this rocky mound, rising above the undulations of the grass, grow many flowers of the scarce mountain everlasting. The little mound is starred thickly with them. Forty-seven short upright spikes of "cat's-ear" are there, each erected from its low bunch of woolly leaves. And they are all of one kind; that is to say, since the *Antennaria dioica*, like some other species, divides its organs of reproduction and bears them upon different flowers, all these spikes are male or staminate ones. Now each one of the forty-seven spikes holds several heads of flowers on the top of its downy stalk, and each head, being composite, bears a good many flowers—a dozen or more together. One sees with a glass the tiny silver-white petal of "everlasting" tissue within the long hair-like calyx, and out from each of these fairy tubes is pushed, one after the other, the brown bunches of stamens that produce the fructifying pollen. Countless little flowers, all about one business! to make the dust that shall fertilize the pistil and swell it for seed, so that when the natural term of years is numbered for these plants, a fresh generation shall succeed them. But where are the pistils without which this pollen-dust is useless? Nowhere can a good search over adjacent ground discover a female, or pistillate plant. What then can these male ones do? They cannot sing for mates like the birds, or wing their way to find them. Wait they must, rooted to the rock. Perhaps a breeze, carrying with it the precious life-producing dust they thrust out, may drop it, perchance, on some far-growing pistil of their kind. Or an insect, brushing them lightly, may find the goal they cannot seek themselves. Or is this all for nought? in vain? only a portion of the vast energy of nature unapplied?

The secret is Nature's; and, though its method may be mysterious to us, the mountain everlasting maintains its existence.

GEOMETRY.

Notes of an Address given at the House of Education, Ambleside, by DOROTHEA BEALE, Principal of the Cheltenham Ladies' College.

How often we hear it said, I do not want my daughter to learn Geometry. I do not see what use it will be to her!

Ah! what do we mean by use? Do we call useful things that which ministers to our bodily organisation, and deny the usefulness of that which gives only ideas, which energises the soul, as gymnastics and mountain climbing strengthen the body? We must, if we would make our children brave and strong, encourage them to climb with us into the Kosmos of ideas. Read that beautiful myth of Plato in the *Phaedrus* on the procession of the gods up to the heaven, which is above the heavens, where "there abides the very being with which true knowledge is concerned: the colourless, formless, intangible essence, visible only to mind, the pilot of the soul. The Divine intelligence, being nurtured upon pure knowledge, rejoices at gazing upon truth, is replenished and made glad. She beholds justice, and temperance, and knowledge absolute, not in the form of generation or of relation, which men call existence, but knowledge absolute."

"This seems very poetical," you will say, "but is not Euclid prosaic? Where is the grand prospect that you speak of? Can it be viewed from the Ass's bridge?"

Do you see any grand prospect as you start in the early morning mist and make the first mile or two, with your face to the mountain side? No! but you are going on towards the summit: you have taken a new direction, and every step you take will bring you into a clearer atmosphere, into a sunshine more penetrating; the region of your vision will enlarge, and your energy will be developed by exercise, and by a sense of your having accomplished something, and the hope of seeing more.

So to study Geometry is to enter on a new path, and we do not see at first whither it leads. It leads us upwards to

the universe of ideas; and ideas are nothing for sense, yet they are most necessary things (if things they can be called) for the every-day life we lead. To these ideas the material world must be adjusted: we *must* think, ere we can act, and the thought alone makes that co-ordination of powers possible, by which we speak and move and act: it alone harmonises and enables.

We boast much of the triumphs of science, and fancy sometimes that we are positivists—that the senses are the basis of everything. But what is science without matter? and the conceptions of matter are entirely founded on ideas of that which cannot possibly exist. No wonder Plato, the great idealist, wrote over the door of the Academy, "Let no one enter here ignorant of geometry."

Geometry leads up into the region of ideas. What is our first definition? It relates to that which is without magnitude—the point—a mere position: we cannot think of a point as existing. What is a line? A mere direction, consisting of points which are not, yet it leads us from one position to another: it is a series of nothings, and is a nothing, and yet we can think of no shape without conceiving this nothing. And a superficies, it too vanishes—it has no depth, and it is bounded by lines which vanish, which lines are made up of points which do not exist.

Not till we come to solids, which have what we call three dimensions, do "nothings grow something," do we come to things which exist for sense; but these which we call real things can be measured only by means of ideas of non-existing things. Our children enter a new world for the intellect when they learn these three primary definitions. A point indicates position, but we must think of it as having *no dimensions*. A line indicates direction, but we must not think of it as having either depth or breadth, only length, that is *one dimension*. A superficies we must think of as having length and breadth, but no thickness, that is *two dimensions*. A solid is said to have *three dimensions*—length, breadth and thickness.

Then I think people can hardly help asking the question which some thinkers have put in our day. If we can reason about ideas which have to do with dimensions which do not exist for sense—if these ideas are necessary for us when we

desire to know anything about sensible things—may we not win truth from the consideration and calculations based on other inconceivable ideas: *i.e.*, I mean ideas that can take no sensible form, even in imagination, such, *e.g.*, as the thought of a fourth dimension of space. And in fact these ideas have thrown light upon algebraical expressions, which we have called irrational or impossible; and in quaternions we learn that $\sqrt{-1}$ has a very real meaning. But I will not dwell here upon this most attractive subject. In our *Ladies' College Magazine* for Autumn, 1883, there is a very interesting paper on the subject by a mathematician, which I would commend to those who have some knowledge of higher mathematics.

I may add that all the progress in higher mathematics has been made by calculations based upon infinite series and infinitesimals. Without basing our calculations upon these ideas, we should have found it impossible to measure the distances of the stars, to make the calculations regarding the concrete facts of population, which are made every day in the Registrar General's office.

Plane Geometry deals then throughout with non-existing things, and by means of these ideas we learn to measure the earth's surface, we trace the path of light, we discover the distances of stars, we find the range of artillery, we know without trying what height of ladder is needed to scale a fortress, we pass the trackless ocean in lines which are known by the captain, and so these ideas are indeed the most practical of all.

And is this not so in other regions of thought? We speak of matter and force and gravitation, but when we really come to think out what we mean by matter, we find we cannot do it, nor can we understand how force acts; and Newton admitted that we cannot understand how gravity can act, though by the knowledge that there is such a power acting according to certain laws, we explain the motion of stars and their courses. And there are what are called secondary qualities of matter, which we know only as producing an effect in us, *e.g.*, colour, taste, smell. We do not know what redness, sourness, aroma is, and these things cannot exist except in something. So we call them accidents or attributes, and the words we make into nouns to express them are really adjective-nouns.

And we may go on to shew that through Geometry we are led upwards towards a world which we call the spiritual realities, which eye cannot see, nor ear hear, nor thought conceive. Force is known to us only through our own souls. No one has seen a soul, yet we know that thinking, feeling, acting power which we call "I"—it is the only thing we know directly, and all things through it. But in another sense we do not know it. It is by not understanding that there are different kinds of knowledge that people confuse themselves. They call themselves agnostics, and fancy they do not know the soul. We have heard of some strange half-witted person, whose name I forget, who said he had swept the heavens with the telescope, and looked into the microscope, and found no God there. He might as well have said, I have been looking with my ear and listening with my eye, and I can see and hear nothing. He was trying to see spiritual things without using the spiritual sense, by which we know the things of the spirit. As the attributes of matter reveal its existence, or the attributes of a personal being reveal the soul; the attributes of spirit, such as righteousness, love, truth, can exist only in a person, and be recognised only by a person. So those are really talking unintelligible nonsense who say, we must love righteousness for its own sake. If there is perfect righteousness, it is the shining forth of the spiritual glory of the supremely righteous One, whom we call God, and to whom our spirits yearn. Though no man may see His face, yet the spirit bears witness with our spirit that He is our Father, that He is drawing our souls to Him, so that as an old philosopher and father of the church has said, when he found rest after long years of restless wandering in the deserts of unbelief and sin—

"Inquietum est cor nostrum, donec requiescat in Te."

THE CARE OF CHILDREN'S TEETH: A NEGLECTED PHASE OF OUR CHILDREN'S WELL-BEING.

*A Paper read before the Clapham Branch of the P.N.E.U.
by W. PENFOLD.*

THE subject I have to present for your consideration, "The Care of Children's Teeth," is one that is forced on the attention of all of us who have the care of children themselves. The need for such care is of comparatively modern date; the new child begins its experience of one of life's troubles, in the way of pain, much earlier than its parents. To attempt to offer any explanation of the marked decadence in the quality of the teeth amongst civilised children, one must go back far in the life's history of the child, and trace, if possible, to what constitutional disturbance may be attributed the failure of protection that nature affords to the teeth in the shape of enamel.

It would be beyond the scope of my lecture to follow the growth of the embryonic teeth, twenty in number, lying side by side in the dental groove. The permanent teeth are all lying hidden in the tender gums when the baby is born, but many months and years must elapse before the latter are called into active service. For seven months before, and from five to nine months after birth, the crown of the first little baby tooth is growing. At first it is a mere sac of living pulp, but having the shape of the future tooth. On this sac are deposited the calcareous elements, or lime salts, of which the hard body of the tooth is formed. Little by little, the delicate pulp is surrounded by dentine—the bony substance forming the body of the tooth. Over this is laid a glassy outer coat of enamel, dense and impervious to the healthy fluids of the mouth, until, perfect in substance, size, and shape, the crown emerges from the gum, the root having to grow longer as the walls of the socket are built around it, to hold it firmly in its place.